Amendments to the Claims:

1 (currently amended): A tunable laser cavity sensor chip comprising:

(a) a reference laser and a sensor laser, each comprising a waveguide having a gain section, opposing mirrors including a partially transmissive mirror, and a coherent light beam output section, at least one of the waveguides having a phase control section, the coherent light beam output sections being joined to enable coherent light outputs of the reference and sensor lasers to interfere;

(b) a sensor region separate and spaced from said phase control section formed through and exposing the evanescent optical field of the sensor laser, for receiving a sample to be diagnosed; and

(c) a heterodyne detector at the juncture of the reference and sensor coherent light output sections for detecting a change in the frequency of the coherent light output from the sensor laser resulting from a change in the index of refraction of fluid in the sensor cavity.

2 (original): The chip device of claim 1 wherein the mirror on each laser opposing the partially transmissive mirror is a facet mirror.

3 (original): The chip device of claim 1 wherein the partially transmissive mirror and the opposing mirror are both sampled-grating mirrors having different sampling periods.

4 (original): The chip device of claim 1 in which said exposed evanescent field region is between the gain section and one of the mirrors of the sensor laser.

5 (original): The chip device of claim 1 in which the sensor laser includes said phase control section.

6 (original): A system for the identification of a plurality of molecular species comprising a plurality of pairs of reference and sensor lasers of claim 1 having a common source of molecules to be diagnosed

7 (original): The system of claim 6 in which the outlet of one pair of reference and sensor lasers is connected in series to the outlet of another pair of reference and sensor lasers.

8 (withdrawn): A method for detecting a molecular species in a sample, comprising:

directing sample to be tested for said molecular species to the inlet of a sample chamber of a tunable cavity sensor chip of claim 1; and

detecting a shift in frequency of the heterodyned coherent light outputs of the reference and sensor lasers thereof.

9 (withdrawn): A method for detecting a plurality of molecular species, comprising:

establishing a heterodyned frequency of a first pair of lasers carried by a chip, one of which has exposed evanescent field material carrying a first ligand thereon for a first molecular species;

directing molecules to be diagnosed from a source thereof to said first ligand;

detecting a shift in the heterodyned frequency as an indicator of the presence of said first molecular species; and

repeating the foregoing steps with a second pair of lasers carried by said chip having a second ligand carried by evanescent field material, whereby to detect a shift in the heterodyned frequency thereof as an indicator of the presence of said second molecular species.

10 (withdrawn): The method of claim 9 in which molecules to be diagnosed are directed from said first ligand to said second ligand.

11 (withdrawn): The method of claim 9, in which the frequency or wavelength of the reference and sensor lasers are shifted to determine the properties of detected species as a function of wavelength.